REMARKS

Claims 1 to 27 are pending in the application.

Restriction Requirement

Applicants hereby affirm the election, with traverse, of the claims of Group I, i.e., claims 1 to 9 and 18 to 27 for further prosecution in this application.

This election is made without prejudice to the file of divisional application(s) directed to the inventions of the non-elected claims.

Claim Objections

Claims 19 to 27 were objected to under 37 C.F.R. §1.75(c) as being improper because they are dependent from a multiple dependent claim.

This objection is respectfully traversed.

37 C.F.R. §1.75(c) reads in relevant part

> (c) One or more claims may be presented in dependent form, referring back to and further limiting another claim or claims in the same application. Any dependent claim which refers to more than one other claim ("multiple dependent claim") shall refer to such other claims in the alternative only. A multiple dependent claim shall not serve as a basis for any other multiple dependent claim. (Emphasis added).

37 C.F.R. §1.75(c) only prohibits a multiple dependent claim from being dependent on another multiple dependent claim. 37 C.F.R. §1.75(c) does not prohibit a single dependent claim from being dependent on a multiple dependent claim.

Dependent claims 19 to 27 are single dependent claims, i.e., each only has a single dependence on or single reference to a prior multiple dependent claim. For example, claim 19 only depends or refers to multiple dependent claim 4. Claims 19 to 27 are not multiple dependent claims dependent on a prior multiple dependent claim.

It is therefore submitted that dependent claims 19 to 27 are in proper form and are not prohibited by 37 C.F.R. §1.75(c).

Note that 37 C.F.R. §1.75(c) expressly contemplates a single dependent claim dependent on a multiple dependent claim. 37 C.F.R. §1.75(c) goes on to read:

> For fee calculation purposes under §1.16, a multiple dependent claim will be considered to be that number of claims to which direct reference is made therein. For fee calculation purposes also, any claim depending from a multiple dependent claim will be considered to be that number of claims to which direct reference is made in that multiple dependent claim. (Emphasis added).

It is therefore respectfully requested that the objection to dependent claims 19 to 27 be withdrawn.

§102/§103

Claims 1 to 5, 7 to 9, 18, 21, 22, 24, 25 and 27 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,993,570 to Gray; Japan No. 10-17929; Japan No. 58-107476; or Japan No. 2001-288512.

Claims 6, 19, 20, 23 and 26 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,993,570 to Gray; Japan No. 10-17929; Japan No. 58-107476; or Japan No. 2001-288512 in view of U.S. Patent No. 6,162,389 to Hase.

These rejections are respectfully traversed.

The Present Invention

The present invention provides a steel for a welded structure to be used for a crude oil tank. The steel exhibits excellent local corrosion resistance in the environment of the floor plate of a crude oil tank and a decreased rate of formation of a corrosion product containing solid sulfur in a gas phase at the reverse side of the upper deck plate of a crude oil tank.

The present inventors found that the concentration of rock salt brine, which varies in accordance with the oil field and the depth of an oil well from which the crude oil came, is as high as roughly 1 to 60 mass % in terms of an NaCl-reduced concentration. Further, the present inventors found that when a steel plate is exposed to such a high-concentration brine, or a high-concentration

of an aqueous solution of halogen, the steel plate surface becomes uneven because of the sediment of corrosion products, sludge, ash and the like. The sites where the base steel dissolves selectively are quickly formed and fixed, and local corrosion develops from these sites.

Sludge is caused by solid sulfur which precipitates as a result of a reaction of hydrogen sulfide and oxygen in a gas phase in a crude oil tank, with iron rust on the surface working as a catalyst.

The present invention targets to enhance corrosion resistance, or resistance to general corrosion, in the environment in question by not adding Cr, but by adding Cu and Mo in combination by respectively defined amounts and limiting the amount of P and S, which are impurity elements, on the basis of the chemical composition of a common steel for a welded structure, as shown in Figures 1 to 4 of the present application.

Patentability

The technology disclosed in USP 5,993,570 ('570 patent) relates to a high strength line pipe and structural steel that is resistant to attack in even the most severe sour gas or wet sour gas service. The '570 patent targets to provide a high strength steel having a very low Mn content, yet which is resistant to sour gas (H2S) degradation and hydrogen-induced cracking (HIS) in the sour gas environment such as NACE TM0284 as disclosed.

However, corrosion resistance caused in the environment of the present invention is quite different from the corrosion caused in the environment of '570 patent. This means that the steel mentioned in '570 patent cannot be used for corrosion in a crude oil tank. The '570 patent does not disclose or suggest the characteristic feature of the present invention and corrosion phenomena present in a crude oil tank.

Although the Mo contents described in Examples of '570 patent are 0.011%, 0.23% and 0.24%, there is no disclosure or suggestion about the small amount of Mo as shown in Fig. 1 decreasing the speed of local corrosion as disclosed in the present invention.

Therefore, the technology disclosed in '570 patent is quite different from the present invention.

The technology disclosed in JP 58-107476 ('476 patent) relates to a high tensile steel excellent in sulfide stress corrosion cracking resistance. The '476 patent also targets to provide a high strength steel having resistance to sour gas (H2S) degradation and hydrogen-induced cracking (HIS) in the sour gas environment. This means that the steel disclosed in '570 patent cannot be used for corrosion resistance in a crude oil tank. The '476 patent does not disclose or suggest the characteristic feature of the present invention and corrosion phenomena present in a crude oil tank. Although the Mo content described in '476 patent is 0.14% to 0.15% for increasing tensile strength, there is no disclosure or suggestion about the small amount of Mo as shown in Fig. 1 decreasing the speed of local corrosion as disclosed in the present invention.

Therefore, the technology disclosed in '476 patent is quite different from the present invention.

The technology disclosed in JP 10-17929 ('929 patent) relates to a production of thick 600N class steel excellent in weldability and toughness in center part of the plate thickness. However, the '929 patent only targets to increase weldability and toughness by the addition of Cu, Mo and W and there is no disclosure or suggestion about corrosion resistance including HIC. Further, there is no test data regarding corrosion resistance in the '929 patent.

In the '929 patent, there is no disclosure or suggestion about the small amount of Mo as shown in Fig. 1 decreasing the speed of local corrosion as disclosed in the present invention.

Therefore, the technology disclosed in the '929 patent is quite different from the present invention.

The technology disclosed in JP 2001-288512 ('51 patent) relates to a method of producing high tensile strength steel excellent in toughness and ductility. However, the '512 patent

only targets to increase toughness and ductility by the addition of Cu, Mo and W and contains no disclosure or suggestion about corrosion resistance including HIC. Further, there is no test data regarding corrosion resistance in the '512 patent. In the '512 patent, there is no disclosure or suggestion about the small amount of Mo as shown in Fig. 1 decreasing the speed of local corrosion as disclosed in the present invention.

Therefore, the technology disclosed in the '512 patent is quite different from the present invention.

The technology disclosed in USP 6,162,389 ('389 patent) relates to a non heat treated high strength, toughness and machinability steel, so-called SCM435 or SCM440, used in an as-worked state. In the '389 patent, Cu is added for precipitation hardening and cuttability, Mo is added for enhancing hardening and strength, and W is added for solid-solution hardening and precipitation hardening. In the '389 patent, there is no disclosure or suggestion about corrosion resistance including HIC, and there is no test data regarding corrosion resistance. In '389 patent, there is no disclosure or suggestion about the small amount of Mo as shown in Fig. 1 decreasing the speed of local corrosion as disclosed in the present invention.

Therefore, the technology disclosed in the '512 patent is quite different from the present invention.

It is therefore submitted that independent claim 1, and all claims dependent thereon, are patentable over US '570, JP '476, JP '729, or JP '512, standing alone, or in combination with US '389.

CONCLUSION

It is submitted that in view of the foregoing remarks, the application is now in condition for allowance. It is therefore respectfully requested that the application be allowed and passed for issue.

Respectfully submitted,

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